JAN 20 1982

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Mr. Richard Ferguson, Hydrologist
Solid and Hazardous Waste Division
Minnesota Pollution Control Agency
1935 West County Road B-2
Roseville, Minnesota 55113

Dear Mr. Ferguson:

Attached are comments relative to the final draft report and appendices of the "Study of Ground Water Contamination in St. Louis Park, Minnesota" by Eugene A. Hickok and Associates. We have discussed some of the major findings of the study and I think we should discuss the comments of all reviewers at a meeting in the near future. As an outcome of a future meeting with the reviewers, I would like to develop a plan of study for soil investigation and treatment alternatives. We should enumerate all data and analysis deficiencies from all sources for the purpose of including those deficiencies into a plan of study.

One critical comment, discussed at the United States Geological Survey meeting on December 18, 1981 and included in my attached comments is the need to develop secure water quality criteria reflecting an acceptable risk level of Polynuclear Aromatic Hydrocarbons in ground and surface water and eventually in soils, since design and costs of treatment are dependent on these criteria. Furthermore, the Minnesota Pollution Control Agency, the Minnesota Department of Health, and the Environmental Protection Agency should agree on the criteria, certainly before design of a treatment or transport system can commence.

If you have any questions regarding the attached comments please call me at 312-886-3007.

Sincerely yours,

Paul Bitter
On-Scene Coordinator

cc: Michael Convery, MDH
Steven Shackman, AG Minnesota Attorney General's Office
Mark Hult, USGS
Roy Ball, Weston

PB:ajg tape#13 Superfund Sites Section:1-7-81

Comments Regarding the Final Draft Report on the "Study of Groundwater Contamination in St. Louis Park, Minnesota" by Eugene A. Hickok and Associates, Funded by the State of Minnesota

GENERAL COMMENTS

The State of Minnesota must formally determine the acceptable health risk level for the coal tar derivitives found in the ground water at Saint Louis Park and the consequent criterion for potable water quality. The USEPA should review the State's determination and/or provide assistance in determining the acceptable levels of coal tar derivitives, particularly Polynuclear Aromatic Hydrocarbons (PAH) in ground and surface water and in soils. For calculation purposes, the number used in the Hickok report, i.e., 2.8 nanograms per liter (ng/l) is acceptable, although not precisely measurable by modern analytical technology.

The gradient control well system is a conceptually sound procedure for controlling the contamination in the ground water. The system should be further considered in light of the political implementability of discharge to a storm or sanitary sewer system. The gradient control well system will probably be a common alternative to any comprehensive treatment solution implemented at the Reilly Tar site. The feasibility of treatment of the ground water to a potable water quality of 2.8 nanograms per liter is questionable from both treatability and cost perspectives. The basis for design and construction costs are difficult to determine based on the report's findings. This comment is further discussed in later pages.

The statement that soils should be excavated and possibly treated presumes limited alternatives exists for removal of soil contaminants. Due to the large range of cost estimates for soil removal and treatment, cheaper alternatives, which may require a longer period of operation should also be considered. These alternatives may vary depending on the quality and quantity of contaminants found within the site boundary. Therefore, site specific soil treatment alternatives may be cost-effective for various locations in St. Louis Park. In any case, capping the area of high contamination as suggested in the report, is not a solution and would only need to be removed at a later date when a soil treatment alternative was decided. Thus, the cost to remove the clay cap would be an additional burden and unnecessary disruption of the environment.

SPECIFIC COMMENTS (in order of the report's presentation)

The use of benzo(a)pyrene as a basis of developing health risks and levels for PAH treatment is reasonable, since data exist for this carcinogenic compound.

The adsorption coefficient, kp, for the glacial drift was determined by extrapolation of a linear regression analysis which may not be valid. We should also know the desorption characteristics under pumping conditions, for treatment purposes.

In regard to the effect on the effluent limitation for discharge of the contaminated ground water to a surface water, the most stringent surface water

quality criterion reported (0.018 ng/l) must be explained in detail, including the results of toxicological studies used to determine bioaccumulation in fish and in humans. The limitation of 0.018 ng/l for each carcinogenic PAH was developed, it appears, by a rational approach, but this is not substantiated. The development of this and other water quality criteria should be reviewed by our respective Agencies before further consideration can be given to a strict criterion. This number, 0.018 ng/l, was proposed as a possible limit, but not used for design and cost calculations. The value of 31.1 ng/l was considered in the report to be applicable for surface water discharge.

Concentrations of PAH found in the groundwater, as reported in another Hickok Study "Drinking Water Treatment and Remedy Evaluation for St. Louis Park, Minnesota", appear to be very low, already in values of nanograms per liter. It is important to determine the background conditions before any treatment methods and costs can be confidently estimated. This is especially pertinent to the long term operation of a carbon adsorption facility or any other treatment facility. Furthermore, monitoring requirements of any operational facility must be established by the Minnesota Department of Health or the Minnesota Pollution Control Agency to better determine total yearly costs.

The claim that powdered activated carbon and granular activated carbon are capable of 95 to 99% removal is impressive, but percent removal is dependent on the influent concentration. In fact, 99.9% removal may be necessary, which requires at least a 10 fold increase in removal capability. The required level of treatment, 2.8 ng/l, could not be approached for potable water quality although surface water discharge quality, 28 ng/l, could be obtained in the report's fundings.

Overall, the need for treatment to meet a surface water quality criterion has not been determined since steady state pumping conditions will dictate the raw water to be treated, if any treatment is necessary. I would like to see a range of data that indicate the initial concentrations of pollutants in the ground water being pumped and the expected steady state concentrations to be treated since this will affect the decision to design any treatment system. If the data is lacking, it should be gathered. In relation to this, it may be prudent to test a three demensional pollutant transport model developed by the United States Geological Survey (USGS) in the Prairie du Chien Aquifer. We should follow up on the Hickok recommendation to test the hypothesis that the Mount Simon-Hinkley Aquifer is contaminated via the multi-aquifer wells before a remedial action for this aquifer can be taken. If the assumption is incorrect, more investigation of pollutant sources is necessary. We should also check the assumptions made in the report relative to the local contamination at well W100 which affects the Hinkley and Platteville Aquifers. We should understand the pollutant transport relationship with the pond at 32nd and Oregon Avenue. This relationship also affects the Middle Drift Aquifer. The ultimate purpose of understanding these relationships is to determine the need and costs for pumping and/or treatment and the length of time of operation of a facility.

The heavily contaminated wastes from the Middle Drift Aquifer may not need to be transported, if biodegradable. Aerobic digestion with land spreading of the sludge also may be a long-term treatment plan that is specific for certain areas of the site. This or similar alternatives would require a long-term use of a specific amount of land area in St. Louis Park, and thus would need local input. Since soil treatment affects, to some degree, land-use in the area, a Community Relations Plan should be implemented at this time.

From the "long-term perspective" elements of the report, the proposed gradient control system would hydraulically flush the aquifer areas in an estimated one to three decades. Since flushing does not seem to significantly reduce pollutants in the various aquifers, indefinite pumping is proposed. This directs attention for cleanup of a single time limiting source which is the contamination in the Middle Drift Aquifer.

Since the Middle Drift Aquifer serves as a major source of pollution to all successive deeper aquifers, it seems logical to prioritize treatment of the contaminants within this aquifer. This is especially true since the deeper aquifers are more pristine and are currently used, to some extent, for drinking water. Thus, a more comprehenisve program would include treatment of the heavily concentrated pollutants in the Middle Drift Aquifer and its soils along with operation of gradient control wells to contain the spread of pollutants in deeper aquifers. This combination should shorten the long-term pumping required and decrease the operation and maintenance costs while increasing the initial capital costs. The cost-effectiveness analysis should optimize these two cost factors. Furthermore, depending on the adsorption characteristics and solubility of PAH, a solvent may be considered for removal of some of the sorbed PAH for eventual retrieval of the PAH through a recovery well. Toward this purpose, it is proposed that the Radian Corporation bench test the soils in the Middle Drift for treatability of a wide range of concentrations and for various hydrocarbons. Eventually, a comprehensive treatment plan for the St. Louis Park site would have to consider this. I recommend that our respective Agencies enumerate the tasks necessary to accomplish this plan.

Use of the gradient control well effluent for industrial purposes is a good idea, and in light of the possible long-term pumping requirements, future industry may be interested in using the pumped water.

I am concerned over the treatment aspects of activated carbon as our Agencies have previously discussed. The report does not precisely state the data for the basis of design and costs. Although the report shows removal down to nanograms per liter, it has not been determined that the Granular Activated Carbon (GAC) may treat to less than ten or twenty nanograms per liter. I understand that bench testing is necessary to determine the adsorption isotherm and capacity to treat to a yet unmeasurable limit. If this is the case, extrapolation of the data analysis to meet the equilibrium concentration of 2.8 ng/l is one method to estimate the amount of solute (PAH) removed per weight of carbon. It seems that the amount of carbon necessary to meet the equilibrium concentration of 2.8 ng/l is much greater than the amount estimated in the report. I cannot accurately deduce from the report exactly what figure was used for percent adsorption of PAH, but literature values for similar organics go far below 0.1 gram solute per gram carbon; and, in fact, a recently published study, "Biodegradation and Carbon Adsorption of Carcinogenic and Hazardous Organic Compounds", EPA, March, 1981, shows an isotherm for benzo(a)pyrene requiring adsorption of 0.22 milligrams of the compound per gram of carbon for a residual (equilibrium) concentration of ten nanograms per liter of PAH. This is equivalent to 0.00022 grams of solute adsorbed per gram of carbon. Of course this value would vary with different carbons and batch tests do not simulate dynamic conditions,; nevertheless, the total amount of carbon necessary, the volume of the column and contact time still have to be determined before costs can be estimated with some confidence for construction of a carbon treatment facility. Because of this concern, for a potentially high quantity of carbon necessary for treatment purposes, it may be beyond the economic feasibility to construct the proposed carbon adsorption facility.

Thus, other processes may, at this level of treatment, be competitive for removal of dilute concentrations of PAH. Additionally, because of the dilute concentrations to be treated, presuming they are removable to potable standards, the requirements for regeneration of carbon may be less than originally anticipated in the report - thus, lowering the costs to regenerate.

Related to the above, we should have data to demonstrate initial and steady state conditions of the pumped water. A treatment plant would have to adequately treat the initial concentrations of PAH as they are affected by the hydraulic and chemical stresses applied to the saturated soils as a result of the operation of a gradient control well system. Similarly, the solubility of PAH may increase and sorption and desorption factors would adjust upon start-up of pumps in the area. I am not aware of the length of time to reach a steady condition, if at all possible. This may at first appear to be a minor point, but we are working with data that are measured in parts per trillion and, I am not certain of the treatment interferences that may occur between various organics and possibly solids, as pumping is restarted. The pilot plant study, if practical to construct, should answer these concerns. If a pilot plant is not constructed, other means of simulating the above conditions should be attempted before design of a treatment or transport system can commence.

Monitoring costs for a treatment system, whether for treatment and discharge or for potable water quality, were not included in the report. These costs should eventually be developed since the cost will be paid by the Community. Furthermore, a monitoring system should be planned with safeguards to ensure a viable drinking water program - should such a treatment system be cost-effective. This concern would apply to the development of new sources of drinking water either from a municipal supply or from deeper aquifers.